

The National HRO Series of Vintage Communications Receivers

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(All photos from <http://www.radioblvd.com/National%20HRO.htm>)

Why I like the HRO:

1. Elmer Mick W5CJO had an HRO-M from WW2
2. Interesting tuning dial and coil sets
3. Local manufacture in Malden, Mass.
4. Coil sets provide slightly higher RF efficiency
5. Tube warmth and high performance (-142dbm MDS, 121db blocking dynamic range on 80m)
6. Ritual/pain of changing coil sets
7. Easy to troubleshoot and tune up
8. Receives better than some modern radios (Kenwood TS140)
9. Nostalgia

I became a ham in 1978. Around this time I discovered the HRO receiver. Bought my first one for \$12.00. Still have it. Now use an HRO-60.

Time span of tube HRO radios:

1. 1935-1962. Improvements over the years: Better RF tubes (6D6 to 6BA6 tube). With HRO-50 added push-pull audio output stage. With HRO-60 added second conversion. HRO-500 and '600 are solid-state. HRO-600 did not sell well as other radios more popular

Main Models of HRO (other variations exist):

HRO (original)

HRO-JR: No S-meter, Crystal Filter. Coil sets do not have band spread

HRO-M: Military (British R-106 Military RAS)

HRO 5TA1: First post-war set. One of my favorites

HRO-7: Case style change, added oscillator regulator tube

HRO-50: Basically an HRO-5 with tuning scale and push-pull audio

HRO-50T1: Same as HRO-50, but with added IF transformers. Tighter IF response

HRO-60: Last successful tube set. Long run from 1952-1964. Adds second conversion.

HRO-500: First National Solid State RX. First synthesized.

HRO-600 Second SS and synthesized. Plug-in modules. Not many in the field.

HRO's were copied by Germany, Australia and Russia. Examples of these still exist. WW2 provided the largest use of the HRO (HRO-W, M and R-106) both in the American and British effort.

HRO Design:

1. Mechanical design by James Millen W1HRX (he missed the call W1HRO) in Massachusetts.
2. Electrical design by Herbert Hoover JR W6ZH and Howard Morgan in Pasadena California.
3. Upgrade to National FB-7 (TRF) and AGS (National's first superhet) for the airline industry (some placed on telephone poles)
4. Hell of a Rush Order

Features of early HRO:

1. Precision Worm (PW) micrometer dial provides accurate tuning of the day. 12 feet if band-spread. 500 divisions. Backlash-free control.
2. Plug-in coil sets for tuning ranges allows optimization of RF transformer stages. Wide range from 50kc to 54mc. Band-spread selection for ham bands.
3. Crystal filter providing "single signal" reception. Good CW performance today.



4. External power supply to reduce case heat.
5. Early use of S-meter (R-meter initially).
6. Early adoption of James Lamb Noise Silencer



Why did the HRO die?

1. National Radio went out of business and sold name to Japanese company in 1974.
2. Collins-style crystal controlled front-end down-conversion provided easy stability even at 10 meters. The HRO required high tolerance components and stability for the L/C based local oscillator.
3. Japanese imports and synthesized radios reduced the number of user adjustments while providing higher value to the ham radio operator.

If YOU get an HRO:

1. Check capacitors. Replace if leaky.
2. B+ (high voltage!) on rear speaker terminals of earlier ones. B_ on rear Mute terminals. HV can KILL!
3. Do not remove coil sets with B+ on
4. Add fuses for HRO-50 and HRO-60 power supply to protect power transformer.
5. Carefully tune set up for maximum performance
6. Enjoy good mechanical and electrical performance of a Massachusetts made receiver!

Fun notes: I solid-stated an HRO with limited success in the 1990s (could not get the oscillator to track). I tried to use an HRO on DRM with a converter. The IF had too much phase shift to decode the digital signal.

Web Links:

<http://www.prismnet.com/~nielw/index.htm>
<http://www.radioblvd.com/National%20HRO.htm>
<http://bama.sbc.edu/national.htm>
http://www.qsl.net/jms/bio_rem/bhnc.html
<http://www.w1vd.com/NationalHRO-60.html>
<http://n4trb.com/AmateurRadio/National/HRO.htm>

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